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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/924,131	08/06/2001	Mark J. Khesin	M0953/7007 (RMA)	3366
7590	02/06/2004		EXAMINER	
ERNEST CUSICK GENERAL ELECTRIC COMPANY CORPORATION 1 RIVER ROAD BLDG. 37, RM. 568 SCHEECTADY, NY 12345			GAKH, YELENA G	
			ART UNIT	PAPER NUMBER
			1743	

DATE MAILED: 02/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/924,131	KHESIN, MARK J. <i>AB</i>
	Examiner	Art Unit
	Yelena G. Gakh, Ph.D.	1743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 15 January 2004.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-29 and 31-41 is/are pending in the application.
 4a) Of the above claim(s) 1-14,25,26 and 35-39 is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) Claims 15-24, 28-29, 31-34, 40-41 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 12 February 2002 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date: _____
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>120301</u> .	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: _____

DETAILED ACTION

1. Election filed on 01/15/04 is acknowledged. Claims 1-29, 31-41 are pending in the application. Claims 15-24, 28-29, 31-34 and 40-41 are elected with traverse. Claims 1-14, 25-26 and 35-39 are withdrawn from the consideration. In response to the Applicant's arguments regarding restriction requirements the examiner would like to indicate that claims 25-27 and 35-39 (Groups III and IV) are classified in the classes, which are beyond the examiner's expertise; Groups I and II require completely different areas of search and are of different scopes. Therefore, the Applicant's arguments are not convincing and the restriction is made FINAL.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 15-24 and 31-34 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 30-37 and 43-44 of U.S. Patent No. 6,389,330 B1. Although the conflicting claims are not identical, they are not patentably distinct from each other because "analyzing means for determining at least one combustion parameter based upon an AC component of the signal" *must be* the "processor that determines at least one combustion parameter based upon AC component of the signal". There is no other "analyzing means" that is capable of performing such operation.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

5. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

6. **Claims 15-17, 28-29, and 40-41** are rejected under 35 U.S.C. 102(b) as being anticipated by Khesin (American Power Conference, 1995).

Khesin discloses an apparatus for monitoring flame radiation and flue gas constituents utilizing fluctuating (AC) component of a flame signal, which “is highly sensitive to changes in combustion conditions or disturbances in the controlled flame” (page 748, left column). A “series of new algorithms related to burner stoichiometry ad mixing rate which can be used for flame characterization and optimization” is disclosed, along with optimum algorithms “to characterize specific parameters, such as NO_x and burner fuel-to-air ratio” (page 749, left column).

7. **Claims 15-17, 20-21, 23⁻²⁴ and 31-34** are rejected under 35 U.S.C. 102(b) as being anticipated by MacDonald (US 4,039,844, IDS).

MacDonald discloses a flame monitoring system including “a flame sensor for producing a flame signal as a function of flame conditions in a monitored environment and flame signal enhancing circuitry coupled to the flame sensor. The flame signal enhancing circuitry has a first

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response as a function of a first characteristic of the flame signal and a second response different from the first response as a function of a second characteristic of the flame signal and is arranged to combine the first and second responses to provide an enhanced flame signal representative of the monitored flame" (Abstract). "In particular embodiments a silicon photosensor is employed, its output response to sensed radiation components varying over the range of 1 microampere to 500 microamperes. A circuit that accommodates the large dynamic range of sensed flame conditions and also produces an output that is directly related to the sensed higher frequency [AC] components and inversely related to the sensed lower frequency (including DC) components is shown in FIG. 3" (col. 4, lines 4-13). "The graph in FIG. 2 is an indication of the proportion of the higher and lower frequency components along the flame axis, the curves 26 and 28 being normalized as a typical average magnitude of the higher frequency component (represented by curve 26) is in the order of 3-5 percent of the magnitude of the lower frequency component (represented by curve 28)" (col. 3, lines 53-59). Since the magnitudes of different frequency components are changing, the corresponding function of the signal changes its shape, as it is defined by the frequencies and amplitudes of the components. The flame monitoring system can be placed in flame and post-flame zones, which does not affect the structure of the system.

8. ²⁴ **Claims 15-17, 20-21, 23 and 31-34** are rejected under 35 U.S.C. 102(b) as being anticipated by Wheeler (US 3,689,773, IDS).

Wheeler discloses "a flame monitor method and system where one pair or more of radiation sensors respond to high frequency radiation fluctuations [AC component] in regions of the same flame or different flames, with each sensor producing an electrical signal indicative of the flame condition. The electrical signals developed by the sensors are utilized by an associated electrical circuit, which produces an output signal, which is a function of the difference in signals of the individual sensors of each sensor pair or the sum of the outputs of the sensor pairs used. Filtering, amplifying, rectifying, and calibrating means are included in the circuit to provide an output signal capable of any or all of the functions of indicating, controlling the flame condition and actuating an alarm" (Abstract). "In operation the sensors 14, 16 produce *an electrical output signal which is a function of the flame radiation*. As the flame radiation flickers, so does the output signal. The sensors are connected series opposing in polarity to produce an output signal

at the terminals of lead wires 28, 30 from which the steady state and slowly varying components have been cancelled by the circuit leaving only the varying difference components. If the flame 34 were extinguished, the sensors 14, 16 would immediately sense only a steady state residual radiation from the surroundings and produce a zero output difference signal indicating the lack of flame" (col. 4, lines 17-29). Therefore, the system is configured to combine two processed AC signals from two radiation sensors and determine at least one combined combustion parameter.

9. **Claims 15-17, 20-21, 23,²⁴ 28-29 and 31-34** are rejected under 35 U.S.C. 102(b) as being anticipated by Astheimer (US 4,435,149, IDS).

Astheimer discloses "a furnace burner flame monitoring method and apparatus ... for controlling the burner fuel mixture in order to operate a furnace at maximum burning efficiency. A radiometer having an infrared detector views the flame and detects infrared radiation emitted from the flame. A filter wheel is interposed between the infrared detector and the flame for transmitting *at least three different, discrete, infrared radiation bands* from the flame to the detector with the detector thereby generating at least three signals in response to radiation received from the three infrared radiation bands. A control parameter is derived using a ratio of at least two of the signals from the infrared radiation bands, which are compensated for flame length using a third of the signals generated by the infrared detector. The control parameter may then be utilized for controlling the fuel/air mixture which is burned for thus monitoring and maintaining the furnace at maximum efficiency" (Abstract). Changing the contribution of the components into the signal intrinsically changes its shape. Unburned particulates in the flame are measured as the basic "oxygen" ratio.

10. **Claims 28-29** are rejected under 35 U.S.C. 102(b) as being anticipated by Platonov et al. (SU 1249427) or Tagami (JP362123218 A).

Platonov discloses a radiation sensor for monitoring the ash flow rates (the amount of ash flow per time unit).

Tagami discloses an apparatus for monitoring the content of smoke and fly ash using electronic television camera and spectroscope, "dividing the image of flame 6 introduced through a space imaging system collected by the light collector 5 or an image fiber into two spectral flame images 7, 8 having wave lengths λ_A and λ_B , and image sensors 12, 14 converting the spectral flame images 7, 8 into pickup amounts 10, 11 respectively" (Abstract).

11. **Claims 15-29, 31-34** are rejected under 35 U.S.C. 102(e) as being anticipated by Myhre et al. (US 5,961,314, IDS).

Myhre discloses "an apparatus for detecting a flameout condition and/or a flashback condition using a single intrusion into the combustion system. In one embodiment, an optical sensor is placed in the region of the combustion system where fuel and air is mixed. During operation, the sensor monitors the condition of the flame, and is capable of detecting the flame. Furthermore, at the onset of a flashback or flameout condition, the sensor is adapted to provide a signal indicative of that condition. ... Another aspect of the invention includes an apparatus for deriving two separate output channels from a single penetration into the engine cavity. For example, one channel may be adapted for detection of flashback, while the other channel may be adapted for detection of flame presence (or, conversely, flameout). In one embodiment, the invention includes an optical detector spaced apart from and optically coupled to the combustion system, through a fiber optic cable which, in turn, is attached to a probe mounted on the wall of the combustion system. The radiation intensity measurement of flame presence and flashback is derived using one or more photodetectors optically coupled to a singular port viewing into the combustion system. In one embodiment, during operation a flashback signal is generated if the sensor output exceeds a predetermined limit. Similarly, a flameout condition is provided if the sensor output is below a predetermined limit" (col. 2, Summary of the Invention). "Although the invention has been described for use with flashback and flame out detection, any appropriate combustor parameter may be monitored. For example, other types of signal processing may be employed such as filtering, spectral analysis (including fourier analysis), etc., in the time or frequency domains for use in determining an operation condition of the combustor" (col. 5, lines 18-30).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

14. **Claims 18-19 and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over any of MacDonald, Wheeler or Astheimer in view of Myhre.

While MacDonald, Wheeler or Astheimer do not specifically disclose the processor which analyzes signals in time domain, Myhre indicates that it is in the scope of any routine in the art to apply either time-domain or frequency-domain processing of the signals using conventional Fourier transform.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yelena G. Gakh, Ph.D. whose telephone number is (571) 272-1257. The examiner can normally be reached on 9:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yelena G. Gakh

2/3/04

